Electricity on the Farm

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May, 1934
Vol. 7 No. 5

Electricity on the Farm

IN THIS ISSUE

Electricity Aids Dairymen in Holding Customers

BY R. U. BLASINGAME

Many dairymen who do not have electric refrigeration equipment are seriously considering the installation of such units, because they are aware of the advantages to be derived therefrom. The author on page 4 outlines the experiences of several dairymen who have found that electric refrigeration solved their milk cooling problems.

The Cost of Cooking With Current

BY VERA B. MEACHAM

The actual cost of cooking with electric current has been investigated by comparatively few people. The reduction in hours of labor to maintain properly an electric range is one of the best arguments for its adoption. Perhaps some of the facts presented by the author on page 8 will pave the way for the electrical method of cooking in more farm homes.

Farm Motors Deserve Load Signals

BY E. B. LEWIS

Overloading of motors often results in serious damage to the motor as well as delay the completion of the task at hand. An overload signal such as described by the author on page 12 is good insurance for any farm motor.

A Better Method of Baling Hops

BY C. J. HURD

Electricity on the farm is finding new applications every day, Mr. Arch Sloper of Independence, Oregon, being one of the recent contributors of a new application. Mr. Sloper developed a hop baler which he describes on page 16.

Regular Monthly Features

Electrical Housekeeping, page 13; On the Air, page 15; Questions and Answers, page 17; What's New, page 18.

EDITORIAL

THE following letter, written by Mrs. Lillian McGill, of St. Johnsbury, Vermont, is an editorial in itself. Very clearly does she argue the justice of easing the housewife's burden by providing her with that dependable, labor-reducing servant —the electric range.

"If there is one group of homemakers that needs the lifting of household burdens more than another, I believe it is the farmer's wife. Her work must start early in the morning, and often does not finish until late at night, and how much of her time is taken up by cooking! You do not often hear of a farmer, or his family, having to pep up their appetites with drugs; their work with Mother Nature takes care of that, and it is up to the wife and mother, at all times, to be ready with wholesome food to satisfy the hungry ones. We all know the problem of trying to bake with wood (the fuel used by the average farmer). At one time the oven gets too hot; the next time it is not hot enough. Perhaps she has been called outside to help with the farm work, and the fire has gone out, or she has been in the hay-field raking, and must come in and start up a hot wood fire to prepare her meals. Can you think of any greater help that you can give her than an Electric Range? It will be ready at all times. A turn of the button means steady heat, temperature control takes away the guess-work, and her cooking can be done at any time during the day, or evening in a sure, safe, clean way.

"Perhaps you will say, 'It would be nice if we could afford it.' Let us look at the way the work is being done outside. Is the husband using a hand rake instead of a horse rake, a scythe instead of a mowing machine, or even a horse and wagon instead of an auto? Must all of the help go outside to father, and mother continue doing her work in the hardest possible way? Let's play fair. The strength of our wives and mothers needs saving fully as much as that of the father. Let's lift her burdens too, that father and mother will be able to enjoy a healthy old age together."

MRS. LILLIAN MCGILL.

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ELECTRICITY AIDS DAIRYMEN IN HOLDING CUSTOMERS

Electric refrigeration on dairy farms is gaining steadily, for it proves a paying proposition

By R. U. BLASINGAME

PROBABLY the best way to start a discussion on farm refrigeration is to find out what the farmers are doing about it. All I find out by writing and visiting about over Pennsylvania is that most of the first rate dairymen are either thinking seriously of providing themselves with some kind of milk cooling system or they have already done so.

About 85 per cent of the 172,000 farms in this state are devoting some time to the dairy business. However, only about 54,000 of these farmers have electricity available. Thus, for some time to come at least, many dairymen in this state must rely on ice or a gas engine driven refrigerator. As a rule, when one cools milk with ice he usually shifts to electric cooling as early as power is available. It then appears that ice and gas engine cooling devices are stepping stones to electric equipment.

For instance, Mr. Howard W. Wickersham of Kelton, Penna., writes as follows:

"In 1922 when I started in dairy business I built a cabinet for cooling milk by the use of ice. This cabinet was a wooden box lined with 3 inch cork, then tar paper and No. 18 gauge galvanized iron. It was built for 8 ten-gallon cans packed in ice. The total cost of material was $55.00. We used this cabinet until 1924, cooling about 5 ten-

The modern milk house on the W. C. House Dairy Farm, Atlanta, Georgia. Electrically equipped, of course, and well screened too.

gallon cans of milk per day with a cost of $20 to $24 for ice per month.

"In May, 1924, I installed a complete water cooled electric milk cooling system, with ¼ h.p. motor, operated by a lighting plant. In 1928 the motor was changed to 220 volts operated from power line. The estimated cost of electric current on a daily production of 5 to 6 10-gallon cans of milk is about 90c per month. To date there has been $8.25 repairs.

"As to efficiency of the box after the water or cooling medium has reached a temperature of 36 degrees there seems to be about ½-degree to 1-degree rise in twelve hours with a temperature of 75 degrees to 80 degrees on the outside.

"I believe that electric refrigeration has aided in holding a good market for my milk by keeping the bacteria to a minimum. Our bacteria count has averaged about 2,000 per c.c. in Philadelphia during the past few years."

Health Regulations Require Refrigeration

One very significant thing about Mr. Wickersham's letter is expressed in the last paragraph with respect to electric refrigeration aiding him in holding his market. State and city health regulations make it essential to refrigerate milk as early as it is drawn. One does not have any choice in the matter. The milk, if not properly taken care of at the farm, is sent back to the dairyman in many cases. Some milk companies cut the farmer off if he persists in sending in sour milk.

A representative of a well known milk company in Philadelphia gave me the following figures for 1932 of milk returned to dairymen shipping to one of their receiving stations in central Pennsylvania.

2,694	pounds	— sour
9,234	"	— bad odor
37,325	"	— high bacteria count

The return of milk to the farmer because of poor cooling, or whatever the cause, is an economic loss not only to the dairyman himself but to the milk distributor and to business in general.

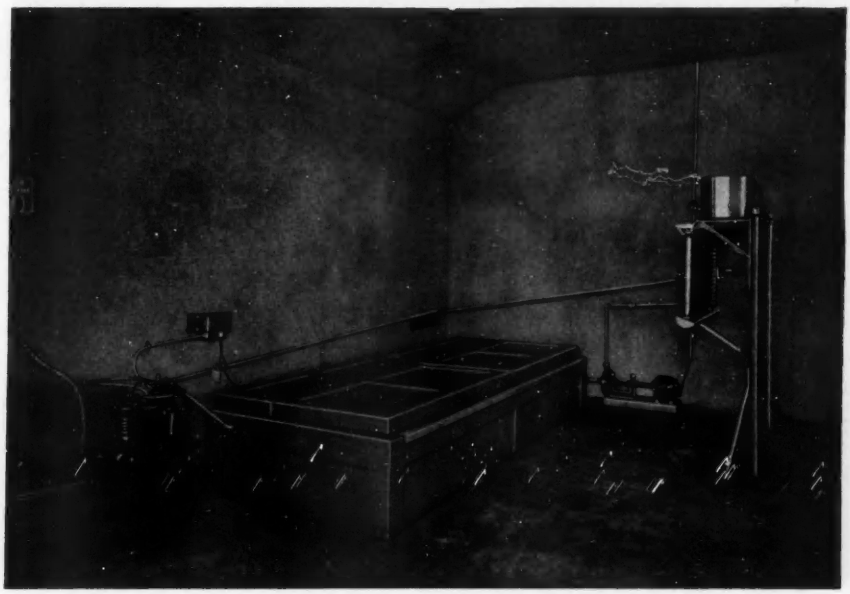
The Bonus

If milk refrigeration was purely a penalty to the dairyman there would be lots of room for complaint. However, there is a reward for clean milk in the form of a bonus or extra price for quality product.

Here is a case in point, involving Mr. Lewis P. Brown, West Grove, Penna., who knows what he is about. Mr. Brown writes:

"I have an electric refrigerating unit and a tank or box in which six ten-gallon cans of milk are cooled daily. I have kept a record of extra cost since putting in the plant which shows average cost per month for the six summer months, May, June, July, August, September and October $3.55. November, December, January, February, March and April $1.77. Cost of operating 12 months $32.12. Bonus for low bacteria count per month is $50.00. Complete outfit cost less than $400.00. With $600.00 bonus the outfit pays for itself in one year and aids in holding our market."

These letters were both written in April, 1933. They are therefore actual farm figures of operations during the depression. One will note that Mr. Brown strikes two very significant notes: first, the bonus and second, the holding of his



Milk cooling room on a modern dairy farm. The cooling cabinet is set low for convenience when storing cans of milk.

market, both direct results of good practices aided by refrigeration.

Twenty-three Refrigerators in 8-Mile Radius

After receiving scores of letters from enthusiastic users of milk refrigerators I made some personal visits out through the country about a year ago. In one community in central Pennsylvania I found 23 electric milk refrigerators within an 8-mile radius. All of this equipment has been installed since the depression was well under way. The farmers all seemed well satisfied with their investments.

Well Water Too Warm

Mr. J. Marshall Spencer of Cochranville, Penna., writes that his market was not stable when he depended upon well water for milk cooling.

The refrigeration unit was installed July 15, 1931, which has been in use daily cooling 2 40-qt. cans of night milk. We do not have to cool the morning milk which goes to a receiving station 7 miles distant. The unit runs from 3 hours daily in the spring of the year to 7 hours daily in very warm weather. The outfit has enabled us to keep our milk under 10,000 bacteria count so we are entitled to a 40c bonus the year around. We keep about 15 Jersey cows with average butter fat of 4.8 to 5.0 and our bonus runs yearly $450 to $600 above base price paid. The outfit cost July 15, 1931, $450 installed. With one well water cooling we were able to obtain only a part of bonus paid with some of our milk rejected sometimes for being too warm. So far, with the cooler, we have not had a can of milk returned. We run the temperature starting at 45 and cooling down to 38. So far the cooler has not given us one minute of bother and has been very satisfactory."

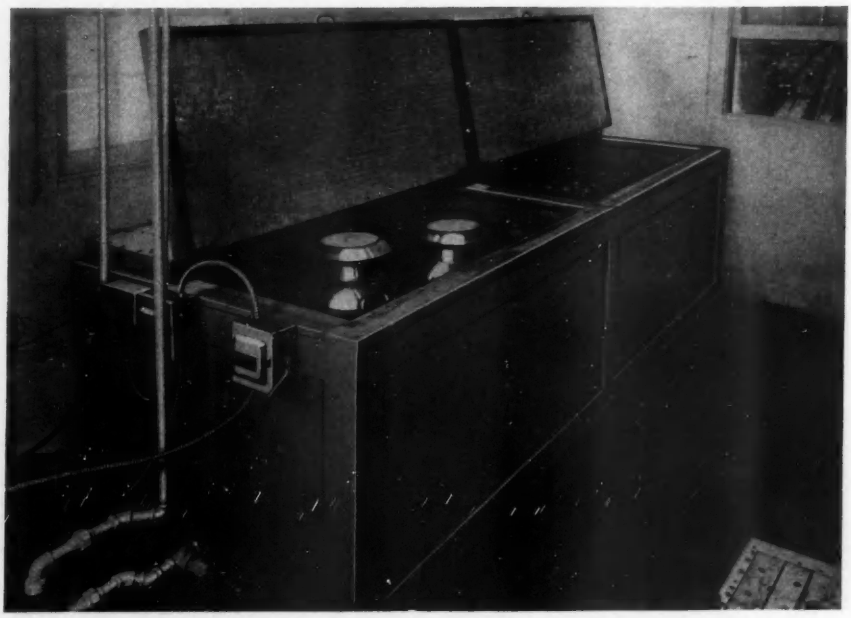
Annual Overhead Costs on Refrigerator

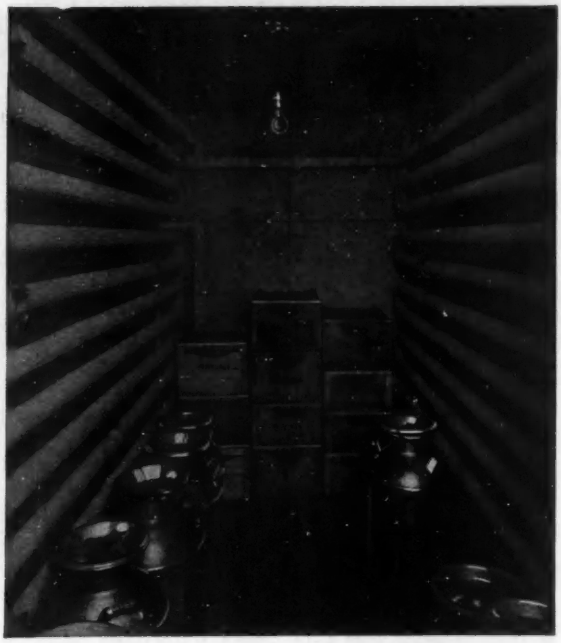
Depreciation (400 ÷ 10) (estimated 10 year life)	$40.00
Interest on average value (400 + 40) ÷ 2 @ 6%	13.20
Repairs at 5% of First Cost (estimated)	20.00
Taxes and insurance (estimated)	5.00
Total overhead cost per year	$78.20

As a rule the only cost figures one sees on electric milk coolers is the current consumption. That is not the only cost. There is always an overhead charge. It is a little difficult to figure accurately because a few assumptions must be made. For instance, I have assumed the following: (a) that a four can cooler installed would cost $400, (b) that this machine would last 10 years, (c) that repairs would be 5 per cent of the first cost, (d) that taxes and insurance would be $5.00. This is figured by the uniform depreciation method and the annual overhead is $78.20 if these assumptions are correct. One can figure the cost per month, week, day and gallon of milk cooled by simply dividing $78.20 by whatever factor one wishes to obtain figures on.

Electric milk refrigerators have not been in general use long enough to ascertain the exact number of years they will last. However, Mr. F. H. Harjes who operates a dairy farm near Valley Forge, Penna., installed the first electric milk cooler I know anything about. That was in 1925. It was a curiosity and purely experimental. This machine has been in operation almost daily

Milk in bulk or bottled ready for delivery may be stored in a cabinet of this type which is in use on the Marshall Vale Farm, Yorklyn, Delaware.





Refrigerated rooms are used where great quantities of milk are produced. Storage space is ample, and the heavy cans of milk do not have to be lifted.

since that time (9 years) and still going strong. No doubt a ten year life is conservative.

Experiences from Other States

The experiences of dairymen in adjoining states are precisely like those from the Keystone State. Listen to this from Mr. Franklin Hicks, McGraw, N. Y.

"My milk cooler has given perfect satisfaction so far. I cooled four and five cans a day. I have figured out that it cost me $0.50 per can a month.

"It saves me the expense of putting up ice and my bacteria ran the lowest that it ever did last summer. I haven't lost the first premium in a year. I am very well satisfied with it."

Then this from Mr. W. R. Everett, Somerville, N. J.:

"At present we are using about 100 kilowatt hours per month to cool 5 cans of milk per day. Without this equipment we could not hold our local market."

On the farm of Royal L. Kinsley, Columbus, N. J., they ship approximately three thousand 40-quart cans of milk a year, Mr. Kinsley has used on an average 1.21 KWH. per can.

The destination of the milk is 80 miles from the farm and the highest temperature at which it was ever received at the destination was 44 degrees.

Before Mr. Kinsley installed electric refrigeration he used ice for cooling milk and the cost for ice alone was more than for electric power, without considering the labor cost. Besides, the lowest temperature he was able to obtain through the use of ice at the farm was 54 degrees.

Mr. Kinsley has been Township Committeeman of Mansfield Township, Burlington County, N. J., for twelve years. He is Past Master of Columbus Grange and is a member of the Guernsey Breeders Association and takes an active part in these organizations.

Research at Penn State

When the rural electrification research program was inaugurated at Penn State in 1928, milk refrigeration was one of the major considerations. It was not until July 1, 1929 that Professor John E. Nicholas was employed as research engineer in charge. With an unusual educational and engineering background he was well qualified for the study of milk refrigeration. Thus far Mr. Nicholas has prepared two bulletins and 14 other papers on various phases of rural electrification. Of these one bulletin and 6 papers have been devoted to milk cooling. Space will only permit a list of these papers which follows:

Bulletin 267 April, 1931, "Farm Electric Milk Refrigeration."

Technical Paper No. 530B, "Refrigeration in Farm Milk Plants," REFRIGERATING ENGINEERING, Vol. 22, No. 6, Dec. 1931, pp. 379-382.

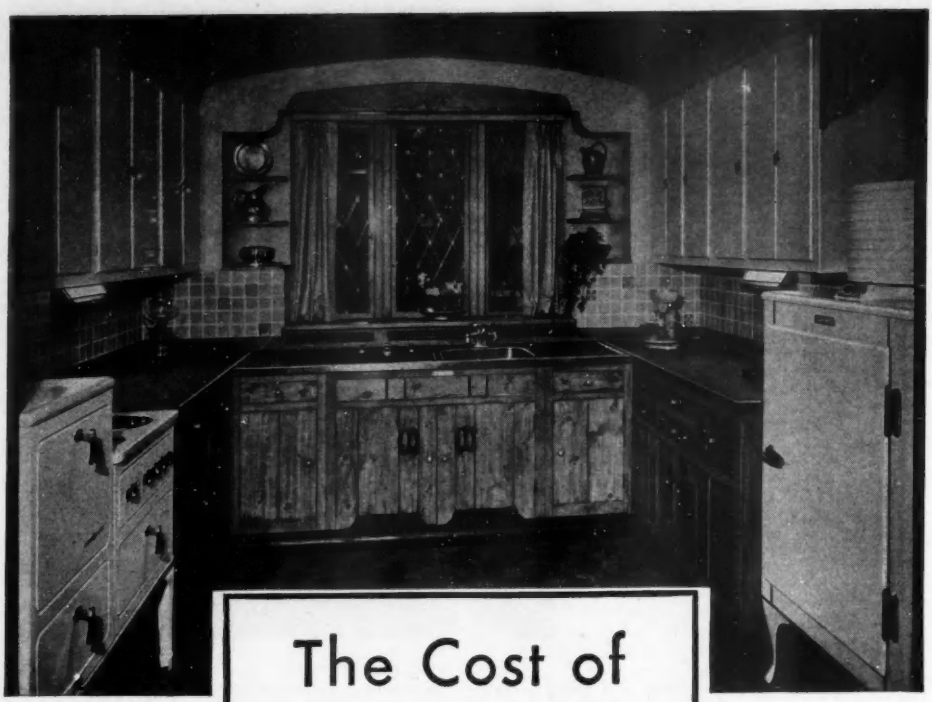
Technical Paper No. 530A, "Service Operating Characteristics on Farm Milk Refrigerating Plants," The Pennsylvania Association of Dairy and Milk Inspectors. Eight Annual Report, 1932, pp. 194-216.

Technical Paper No. 561, "Temperature Gradient in Milk When Cooled by Direct Immersion," AGRICULTURAL ENGINEERING, Vol. 13. No. 9, Sept. 1932, pp. 230-231.

"How Old Should Milk Be?" THE MILK DEALER, June, 1933.

Technical Paper No. 600, "Speed and Uniformity Tests with a Dairy Farm Cooling Unit," REFRIGERATING ENGINEERING, Vol. 27, No. 1, Jan. 1934, pp. 15-18 and 31. C

Technical Paper No. 629, "Newer Methods of Cooling Milk at the Farm with (a) Electricity, (b) Gas engine, (c) Ice." Ninth Annual Report of The Pennsylvania Dairymen's Association, 1934.



The Cost of COOKING WITH CURRENT

By VERA B. MEACHAM

UNTIL we began to buy the fuel for our cook stoves by the kilowatt hour instead of the ton, the cord, or the gallon, there was not much talk about the cost of cooking. For the coal or wood usually came from the same supply that heated the house, and the liquid fuel was also used for lamps, lanterns, and even the tractor. So we did not pay any attention to its part in producing an apple pie or a dish of mashed potatoes.

But the cost was there even though it failed to show up in a separate bill at the end of the month. And that cost, whatever the fuel, included more than dollars and cents. There is another charge against that account for cooking, too, a charge for time and labor. It costs all three,—money, and hours, and work, to cook our food.

In studying the cost of cooking with electricity, the cost in money is easiest to find. We have only to look over somebody else's shoulder at her bill for electric service, or, if no convenient shoulder presents itself, to take the average use of current for dozens of ranges on farms the country over.

Tests to Determine Current Consumption

During the past decade many trained experimenters in state agricultural colleges have been curious about the cost of cooking with current. So they put separate meters on farm ranges, hundreds of different ranges, to record how much current was used. Their published reports give us,—not gossip, not hearsay, but the actual, unbiased reports of the amount of current other folks use for cooking.

The records of electric ranges doing all the cooking on 267 farms scattered from New Hampshire to Washington, and from the Great Lakes to the Gulf show an average of 128 kw-hrs. a month.

Where the size of the family is given in this

group, it averages about five. In other words, it took about 26 kw-hrs. to cook a month's meals for each member of the family.

But there are wide variations from this average. For example, one family of four used 93 kw-hrs. a month and another the same size used 216. Five people required 173 kw-hrs. while five others got along with 70. For families of six the extremes are 130 and 260. Two seven person families in the same state averaged 119 and 193 kw-hrs. a month.

These are the records of ordinary farm use and of course they differ just as the gasoline and grocery bills at our house differ from the bills of our neighbors down the road. Unfortunately the reports do not explain all the conditions and the good and bad habits of use that caused these wide variations. But they do show that the cooking for seven people may take only half as much current as some other families use in cooking for

You can cook a whole meal in the oven.

It takes 56 minutes a week to keep the coal stove clean.

four. Perhaps there is very little baking done in that first kitchen; perhaps the housewife in charge of the range is an exceptionally good manager.

Whatever the reason actually was in these particular households, the cost of cooking does rise and fall with the way a woman runs her range.

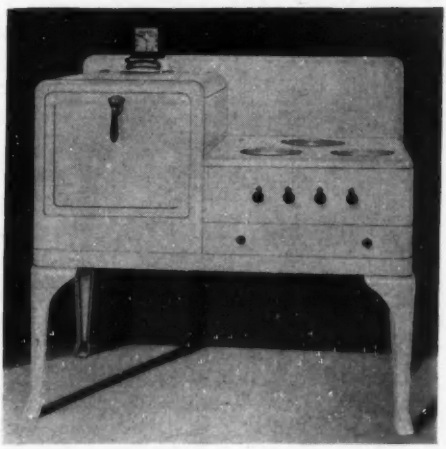
There should be no mystery about this. When you cook with electricity you have a fuel that can be turned on just when you want it in a unit that is built to focus its heat on the pan that holds your food, or in a well insulated oven whose thick walls keep the heat in. It can be controlled to produce just the amount of heat you need, and it can be shut off instantly when the cooking is done.

Let me show you what I mean. I can do it best I think by telling you how I cook potatoes. After washing and peeling them as usual, I put them with only half a cup of water in a flat bottomed pan with a tight fitting cover. This pan just covers the right hand front burner of my range. I turn this burner on high and it then takes 1200 watts. In a few minutes steam comes out around the cover. Then I turn the burner to low. That means I turn off three-fourths of the current and use only 300 watts. In about ten minutes I shut off even this 300 watts and let the heat that remains in the burner keep the kettle boiling till the potatoes are done.

The cost of my cooking is low because I have used only the current I actually needed to cook those potatoes for dinner.

In the oven the thrifty use of energy is even more exact. When I am going to bake bread, I set the automatic temperature control at 375 degrees, turn the current on, and wait for the thermometer pointer to show that the temperature in the oven has reached that point. As soon as it does, the light in the indicator dial goes out, a signal that the control has turned off the current.

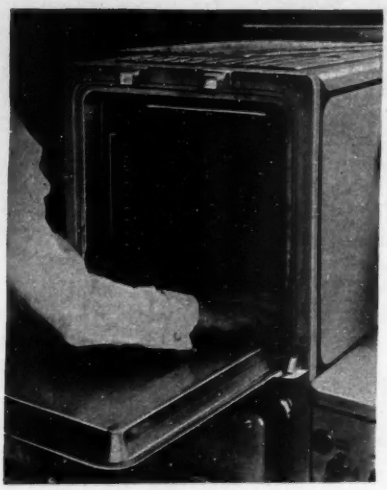
Then I put my bread in and look at the clock. For the next hour, I need give it no attention, for the control will see to it that current flows into the oven to keep the temperature I want, and it will turn the current off promptly without wast-



How long would it take to clean this stove?

ing any when the oven is hot enough. From one-third to one-half the time the electricity will be off, and my baking will be going forward on the heat stored up in the thick walled oven.

You can see that when you cook with current, there is no waste of fuel unless you waste it. You



The thick walled ovens are well insulated to keep the heat in. The racks and heating units come out for cleaning.

can buy just the amount you need to cook your food.

Whatever that amount may be, and whatever the price you pay for it, the cost in labor and time always goes down when you cook with electricity.

There are no fires to build, no fuel to handle, no ashes to carry out, and far less cleaning to do. Just how much hard work this saves has never been measured, but it is closely related to the saving of time, and that has been set forth most clearly in a study of the various fuels in use on Indiana farms, a study made by Miriam Rapp of the Department of Home Economics at Purdue University.

"The process of cleaning the stove," says Miss Rapp, "takes more time than any other item entering into the care of this piece of equipment. 56 minutes a week for coal and wood stoves, 64 minutes for kerosene, 44 minutes for gasoline, and 26 minutes for electric stoves."

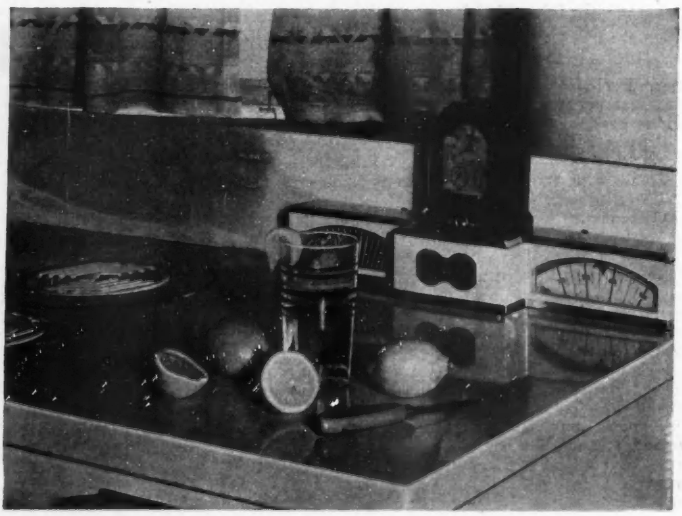
But cleaning the stove is only part of the story. With all fuels except electricity some one has to fill the wood box, or bring in the oil can. It takes time to generate the burners on a gasoline stove, to fill oil tanks, to kindle fires and keep them going, and more time on top of that to scrape flues and carry out ashes.

When she added them all up, these odd jobs in the operation of stoves, Miss Rapp found that Indiana women were spending 2 hours and 2 minutes a week just taking care of the stove if they cooked with gasoline. Kerosene stoves took 1 hour and 17 minutes of care, and a week's care of wood and coal stoves required over three hours. The electric stoves needed no care at all but cleaning, and that was so easy that it took, as we have said, only 26 minutes a week.

Save Labor by Using Electricity

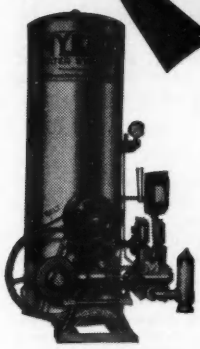
Besides the cost of the fuel itself, cooking with wood or coal cost over three hours of labor a week or 20 eight-hour days every single year. The women who cooked with current cut down that yearly expense of time and labor to less than three days. That means an annual saving of about 17 days of heavy and messy work.

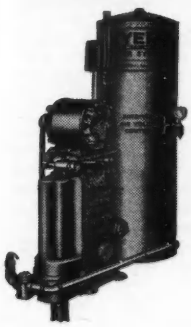
The expense of cooking with current cannot be pinned down too closely. But to get an estimate of the cost for your cooking, if you have a handy average family of five, you can multiply 128 kw-hrs. by the electric cooking rate in your neighborhood. At 3 cents, a rate picked at random, this is $3.84. For some such sum as that, you buy not only the safest, simplest, most convenient cooking in the world, but free time, too, more than two weeks' time of every year when you change from cords to kilowatts for your kitchen stove.

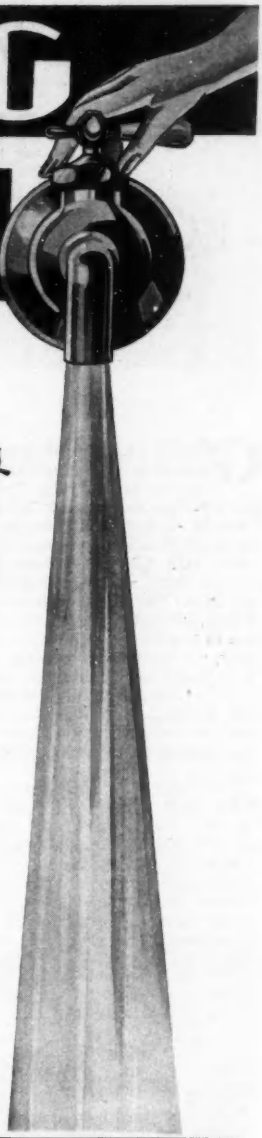


The top of this range is stainless porcelain enamel, an acid resisting finish.

RUNNING WATER







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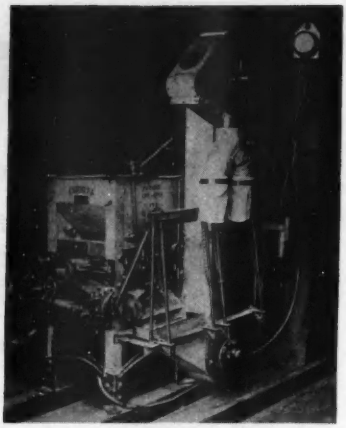
FARM MOTORS DESERVE LOAD SIGNALS

By E. B. LEWIS



A 2-H.P. motor operates this roller mill. Ammeter on post near mill signals the men when full load comes on the motor.

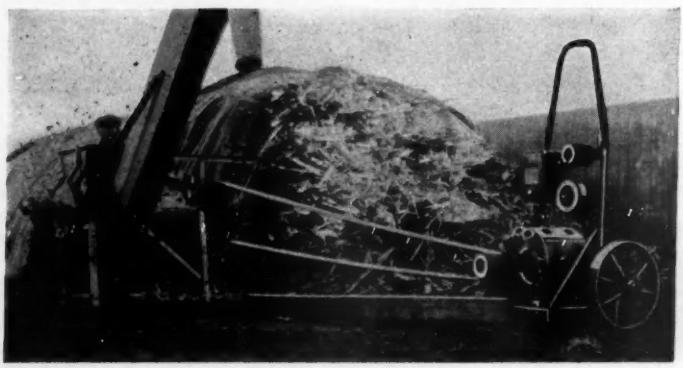
GEO. WELSH of Seward, Nebraska, has used an electric motor on a hammer type mill several years; John Buell, Havelock, Nebraska, uses one on a small roller mill; and Edw. Bade, Lincoln, Nebraska, uses the same type of power on a burr mill, an ensilage cutter and a roughage mill. All three men have had much the same trouble from overloaded motors. The educational work of the Rural Electrification workers has aided materially in getting farmers acquainted with the operation of electric motors but the changing power requirements of feed grinding are confusing. There are such great variations in the power required for the same grinder when different feeds are ground, or a finer screen or greater tension used on rolls or buhrs, that no one without plenty of experience can make good guesses concerning the load to the motor.

The sound or speed of a motor changes very little with change of load. Even if these did change, the noise of the grinder drowns other sounds. Heated motors, burned-out fuses, or open thermal relays are results almost every time some unusual grinding is attempted. With small outfits there is a tendency to hurry the job along. Over-fusing circuits and blocking thermal protection are often practiced, and the motors are damaged.

On several motor-grinder installations in Nebraska a small ammeter has been installed to indicate loads at any time the motor operates. This ammeter is of the movable iron vane type and rugged enough to stand the abuse caused by the starting load to the motor. A red mark on the ammeter dial is the warning, and this is placed at the position on the dial that indicates motor name plate data full load.

The owners of these installations, over which the ammeter is the watch dog, have fewer grinding worries than formerly. New men on new grinding jobs no longer have excuses for blowing the only remaining fuses left on the farm, and more kinds of work are attempted with the equipment. The ammeter is so placed that the men feeding a grinder or another machine can see the face and dial. The red mark on the dial serves as a good warning to men that have any desire to operate successfully where the motor has less capacity than that required when the machine is fed to its maximum. Mr. Bade's men even discovered that the ensilage cutter running at low speed becomes one of the best kaffir or sorgho seed threshers and at the expense of very little power. They would never have tried this without

(*Continued on page* 18)



When the fodder was damp or fine grinding was desired, the ammeter placed nearby allowed the operator to get fastest grinding without interruption.

ELECTRICAL HOUSEKEEPING

Conducted by GAIL MEREDITH

FAIR AND COLDER

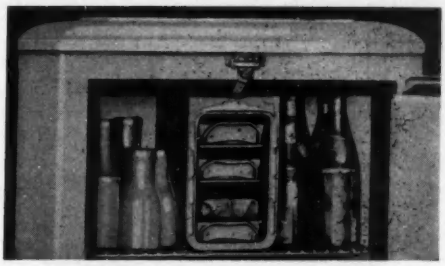
THE 1934 refrigerators offer new allurement and new advantages to thrifty shoppers.

Modern science insists that cold is necessary for the safety of perishable foods. A steady cold, a reliable cold, a cold somewhere between 35 and 50 degrees. You get that cold without physical effort, or even anxious attention when you buy it in a mechanical refrigerator.

The new boxes are as severely simple in their lines as a box can be, but their finish is lustrous white, and in the lacquer as well as the porcelain, it promises to retain that whiteness without stain or fading.

Any standard make offers mechanical excellence today. It will give steady dependable refrigeration all through the year. It has the capacity to furnish more cold than you are ever likely to need. The new machines are quieter than ever, and they offer greater economy in operation.

The reduction in the cost of running the refrigerator has come in various ways. It is partly due to improved insulation, and partly to improved machinery. After the motor is under way, some



An automatic release for ice trays.

refrigerators will run on as little as 100 watts of power, the amount you use in the center light in your kitchen, perhaps.

To find out just what this was going to mean in actual operation, one power company put a meter on a new refrigerator and took the readings for the first three months of use. In that kitchen the refrigerator used just 25 kw. hrs. a month.

This was winter time use,—and of course, no two housewives store just the same amount of food, or open the doors the same number of times. It cannot be looked upon as the basis for any general estimate of the current consumption of

NOW YOU CAN MAKE MORE MONEY ON MILK!

You too, can make more money on milk . . . just as thousands of other dairymen are doing today.

ESCO COOLING EQUIPMENT **makes money** for you . . . because it makes your milk more salable. It safeguards your market by reducing your bacteria count . . . and raising the quality of your milk.

With an ESCO MILK COOLER, you avoid the expense and extra work of cooling milk with ice . . . you eliminate losses caused by improper cooling, because you quickly and automatically cool your milk to below 50 Degrees and keep it cold until shipped.

Thousands of dairymen have found that their ESCO ELECTRIC MILK COOLERS pay for themselves from the very start.

Patented ESCO Electric Milk Cooler

Clip this Coupon NOW

and Get Free Pamphlet "How to Make More Money on Milk."

ESCO Electric Dairy Sterilizer

THE ESCO ELECTRIC UTENSIL STERILIZER

Sterilizes as it dries. Cans and pails, or bottles, are freed of bacteria as they are dried, without smoke, dirt or fire hazard.

ESCO

ESCO CABINET CO.

West Chester, Pa. 5EOF34

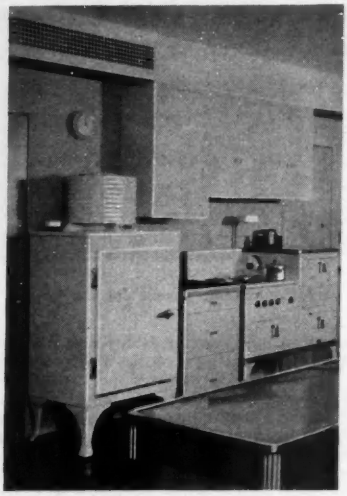
I am making . . . cans of milk . . . bottles of milk a day. Please send information on ESCO Electric Milk Coolers, Utensil Sterlizers and Water Heaters . . . also FREE Booklet "How to Make More Money on Milk."

Name .....Address .....

P. O. .....State .....

refrigerators. But just as one neighbor to another, it seems worth reporting.

The new refrigerators offer a wide range of temperature differences inside the box. In some



There is beauty of design in the new refrigerators.

the temperature can be changed by moving a control button. In some there are zones of different temperatures in different parts of the cabinet.

First of all, there is just the right temperature for food preservation in the storage chamber itself. There is a different temperature in the section for freezing ice cubes and desserts. Often that is divided so one tray will freeze much faster than the others. In some there is a section that is kept constantly below freezing. Here you can keep meats or fish, or store ice cubes and frozen desserts indefinitely.

There has been further thought for convenience in planning these new boxes. They save steps by giving us a pedal we can touch to open the door, or a latch we can open with a push of our arms when we have both hands full. One has an extra shelf that slides out to hold dishes while we are storing the food in the box; another, a special shelf that comes right out for use as a tray in carrying an armful of food at once.

New Models Have Improvements

Ice trays have become more tractable. In one refrigerator, you have only to touch an automatic release and the ice tray slides out with never a jerk. The cubes show the same discipline. All kinds of devices are appearing to insure getting the cubes out without the fuss that sometimes harried the busy housewife just as dinner was ready to go on the table.

A good deal of thought has gone into the arrangement inside the cabinet. Never before have the boxes been so well designed to make the best use of all the space. Sliding shelves that pull out as rigid and straight as a table leaf, adjustable shelves that can be raised or lowered, divided shelves that flip one section up to let in a bottle or two, all these make it easier to find a place for everything.

Then, too, there is a decided turn to the built-in features that give you a definite place for storing vegetables and fruits, a tray for dairy products, and even in one refrigerator a section with little separate containers to serve as a catch all for leftovers.

On the whole, I should say that if you are going shopping for adequate, dependable, year-round refrigeration, you will find it, together with its safety for foods, with beauty for your kitchen and with less work every day for yourself, in one of these new refrigerators.

• • •

Refrigerators have different temperatures for different needs.

BAKED CUSTARD

CAN you make a good baked custard? One that comes out of the oven smooth, yellow, and firm, with a crinkly brown skin on top?

Here is a recipe from the kitchen laboratory of one of the big stove companies. It is particularly helpful because it goes into details of the baking, where the secret of all good custards lies.

4 cups scalded milk — ½ cup sugar
4 to 6 eggs — ¼ tsp. salt
Few gratings nutmeg

Beat eggs slightly, add sugar and salt, pour on slowly the scalded milk, strain and put in buttered mold, set in pan of hot water. Sprinkle with nutmeg, and bake in slow oven, 325 deg. until firm, which takes 1¼ hours. This may be readily determined by running a silver knife through custard; if knife comes out clean, custard is done. During baking, care must be taken that water surrounding mold does not reach boiling point or custard will whey.

Always bear in mind that eggs and milk in combination must be cooked at a low temperature.

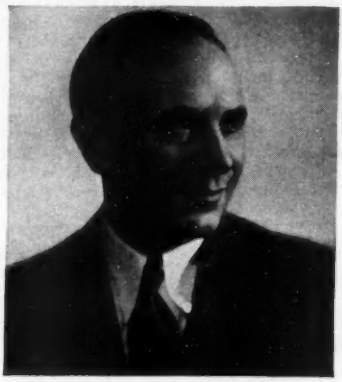
(*Continued on page* 18)

ON THE AIR

Conducted by Jerome J. Henry

Short Wave Sets Span World

MANY listeners these days are enjoying the use of short wave receivers. Although both CBS and NBC frequently relay network programs that have been sent from foreign countries by short wave, and in the case of Admiral Byrd, from Little America to CBS by short wave and in turn rebroadcast on long waves, new short wave sets make it possible to span the globe in the course of an evening.



Here's a new picture of Walter Blaufuss, one of the favorite conductors of farm radio listeners. Blaufuss conducts the Homesteaders orchestra which is heard daily in the National Farm and Home Hour.

Stations in foreign countries, ships, planes, and dozens of other interesting sources of broadcasts may be tapped by the radio enthusiast whose radio range is lengthened by the use of short wave.

• • •

Guernseys Safely Housed in Antarctic

TWO Guernseys, and a calf born en route to the Antarctic and appropriately named "Iceberg," are now safely housed at Little America, say radio reports received from the Byrd expedition. Members of the party decided to take two Guernseys along to furnish some fresh milk for the explorers.

The cows made the trip like veterans of the sea, and while on the way grew shaggy coats of hair that makes them look more like Shetland ponies than dairy animals. From the ship to Little America the cows walked over the icy wastes with little Iceberg humping his back and leading the way.

At the permanent expedition headquarters a dairy barn quite different than the buildings we know in our dairy states was constructed. This shelter was cut out of the snow and when the Antarctic winter sets in the Guernseys' barn will be completely covered with snow.

Members of the expedition report that the cows show no ill effects from the journey and that their production of milk continues at a high level.

These cows, incidentally, are the first to complete a journey to the polar regions.

Reports of the expedition activities are frequently sent back to civilization by short wave radio. Rebroadcasts direct from Little America are featured every Saturday evening over a Columbia Broadcasting System network, and listeners who possess one of the modern receivers equipped for short wave reception may tune in to Little America direct when conditions for reception are good.

• • •

Forest Sketch on Air for Farm Listeners

"UNCLE SAM'S Forest Rangers," true to life dramatic episodes presented in the National Farm and Home Hour every Friday, depict the lives and adventures of Rangers on duty in the national forests.

The episodes are prepared by one of the Rangers, a veteran of Aspen, Colorado, and enacted by star radio actors including Harvey Hays who takes the lead role of Ranger Jim Robbins.

Many interesting occurrences that take place in the national forests have been incorporated into

NEW DAIRY BOOK TELLS ABOUT THE GREAT FRIGIDAIRE FLOWING COLD MILK COOLER

"How to Make More Money on Milk" is the title of this interesting dairy book. Full of valuable suggestions for increasing dairy profits. Quotes experiences of successful milk producers and dairymen. Shows how you can cut costs and boost income as others have done.

Also illustrates and describes sensational new Frigidaire FLOWING COLD Milk Cooler. Never anything like it before. Patented automatic leveler holds water at constant height with *one* or *several* or *all* cans in tank. Automatic refrigeration and water circulation. Cools milk from body heat to below 50° in about an hour. Storage temperature very cold. Cooler is complete and low in price. Cost of operation less than half the cost of natural ice.

Send for book now and get information worth real money to you.

MAIL THE COUPON OR A POSTAL AT ONCE

FRIGIDAIRE CORPORATION, Dept. T-27, Dayton, Ohio. Send book, "How to Make More Money on Milk," without cost or obligation.

Name.....

Address.....

P. O......*State*.....

the dramatic radio sketches. By following the series listeners may follow the Ranger's activities in managing the timber areas, watching for fires, managing the job of grazing the forest areas intelligently, and even the love affairs of Jerry Quick, the assistant Ranger whose youth and ambition often lead to enjoyable situations.

All of the episodes are prepared and supervised by members of the United States Forest Service staff and are broadcast as part of weekly Conservation programs.

• • •

Those Sound Effects— How They're Done

TRAINS roar, fires crackle, bells ring, shots reverberate all in the course of a single evening over your loudspeaker. All of these sounds lend realism to radio programs many of which would be rather unattractive without some simulation of the actual noises which accompany certain parts of a play or dramatic sketch.

Most listeners at some time or other have wondered how these sounds are created before the microphones. Although there are various ways of duplicating a variety of sound, for example, a train, there is usually one best or commonly accepted method.

A raging fire, for instance, may be merely bits of strawberry boxes and cellophane squeezed in the hands of a sound effects man. A train requires more complicated plans. One network sometimes uses a miniature size train which revolves on a circular track with ties that make the wheels click as they roll over the rail separations. Real steam train whistles have sometimes also been used for broadcasting.

Tap dancers may be imitated by tapping a pillow with paddles, and a raging waterfall may come out of a comparatively small bucket. Slamming doors and footsteps are usually provided by the actors themselves who actually walk or close a wooden door mounted on a frame in the studio.

Occasionally a sound effects expert must spend hours attempting to devise methods for reproducing various sounds called for in a radio script; and, sometimes, after everything has failed, the expert finds the easiest way out of the situation is to use the real thing.

A Better Method of Baling Hops

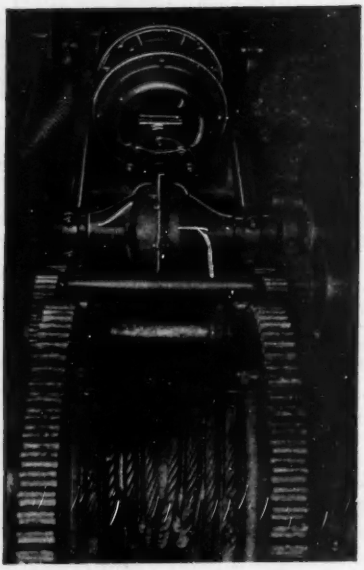
By C. J. HURD

ADDING to a constantly growing list of agricultural uses of electricity, Mr. Arch Sloper, of Independence, Oregon, has developed a hop baler of exceptionally good operating characteristics, using a 5 h.p. electric motor for the power unit.

Mr. Sloper owns and operates a large hop farm near Independence. He has had over twenty years of experience in hop growing and during this time he has made many improvements in his farming methods which have reduced his overhead and operating costs. Says Mr. Sloper:

"My farm is now almost entirely operated by mechanical power, but have been keeping a horse the year round just to do a little garden work in the spring and to turn the old fashioned windlass hop baler in the fall."

This surely didn't seem like good economics to him, so for the past year he has been busy designing and building a mechanical hop baler. As completed and used this past season, it is a marvel of sturdiness and efficiency.



The power end of Mr. Sloper's hop baler. The motor replaces a horse and a boy.

Description of Hop Baler

The hop baler is designed for either gasoline engine or electric motor power. Although the engine or electric motor speed remains the same throughout the baling operation, the speed of the press varies automatically so that the initial pressing is fast when little power is required and gradually becomes slower as more pressure is needed. Also, the speed in carrying the press back for the next baling operation is three to four times the carry-down speed. Heavy cast spiral drums accomplish this variation in speed in pulling the press down and an arrangement to shift to a large driving pulley makes possible the fast carry-back.

The power cost of baling hops is almost negligible, being less than a half cent a bale, at five and a half cents a kilowatt hour. The quietness of operation, the ease of control, the speed of baling and the absence of any fire hazard makes Mr. Sloper's baler an outstanding success. Another job is taken away from the horse and another step forward is taken in farm operation.

Questions and Answers

Conducted by H. J. GALLAGHER

Question: *Why are wires along the power line crossed?*

C. H.

Answer: The system referred to is known as the transposition of lines. On three phase lines the three wires without transposition would continue to run parallel to each other. A characteristic of parallel high voltage A.C. lines is to build up a surrounding field of induction that increases in scope and intensity with the distance. This field of induction retards the flow of current and may seriously interfere with parallel communication systems. To reduce the intensity and limit the scope of the induction field the wires are crossed in relation with each other so that each wire follows a spiral course along the power line.

The number of transpositions range from one in one and one-half mile to one in three miles, depending upon local conditions.

Question: *I have about* 100 *feet of pipe* 4½ *feet deep between the pump and stock tank. This year it has frozen for the first time. Can it be thawed out with electricity?*

J. M. B.

Answer: There have been numerous inquiries similar to yours this past winter and the thawing process by electricity is simple if the right type of equipment is available.

A large 6-volt transformer is connected to the farm service ahead of the meter and the secondary cable is connected to each end of the pipe line. Current flows at the rate of approximately 300 amperes and the resistance offered by the pipe is dissipated in the form of heat. An hour or two will usually be required to melt enough ice to permit the water to flow. The water should be kept flowing until all of the ice is melted.

The transformer used is an expensive piece of equipment and is usually owned by the power company or some local agency. It is advisable to locate the equipment through the power company if possible and secure their permission to connect ahead of the meter as the ordinary meter would not have sufficient capacity to handle so large a load.

CHROMALOX
SUPER SPEED RANGE UNIT

Boils Faster—
No Current Wasted

Mrs. A. J. Kachik says: "I have one Chromalox unit installed on my range . . . I find everything comes to a boil in much less time. There is no electricity wasted so that means a saving in our light bill."

Try Chromalox Free on your own range without obligation.

Ask your Power Company for details or write to EDWIN L. WIEGAND CO., 7580 Thomas Blvd., Pittsburgh, Pa., Manufacturers Chromalox Electric Heating Units.

Inquiries Answered without Obligation!

Now is the time to find out how electricity can improve operations on your farm.

Many of your questions can be answered most satisfactorily by our advertisers. Read the advertisements carefully, for these manufacturers are best equipped to help you and will answer your questions without obligation.

Any information that you cannot obtain from advertisers will be promptly supplied if you will fill out and mail the handy coupon below.

FOR WATER SUPPLY:

Automatic Water Systems (*see advt., page* 11)—Pump Jacks (*see advt., page* 11)—Water Heaters (*see advt., Inside Front Cover*).

FOR THE DAIRY:

Milking Machines—Milk Coolers (*see advts., pages* 13 *and* 15)—Cream Separators—Churns—Bottle Washers—Dairy Sterilizers (*see advt., page* 13)—Clipping and Grooming Machines.

FOR POULTRY:

Incubators—Brooders—Time Switches—Drinking Fountain Warmers—Ultraviolet Light.

FOR THE HOUSEHOLD:

Ranges (*see advt., Inside Front Cover*)—Refrigerators—Clothes Washers—Vacuum Cleaners—Ironing Machines—Dishwashers—Flat Irons—Food Preparing Machines—Ice Cream Freezers—Sewing Machines—Table Appliances—Clocks—Range Replacement Units (*see advt., page* 17 *and Inside Front Cover*)—Floor Polishers.

FOR REPAIR AND MAINTENANCE:

Soldering Irons—Tool Grinders—Drills—Paint Sprayers—Woodworking Machinery—Motors.

MISCELLANEOUS:

Feed Grinders—Ensilage Cutters—Corn Shellers—Hay Hoists—Feed Mixers—Stationary Spray Plants (*see advt., page* 11)—Burglar Alarms—Ventilators—Soil Heating Equipment—Radio Sets.

—FREE INFORMATION REQUEST—

Electricity on the Farm, 24 W. 40th St., New York

Without cost to me, please have manufacturers send complete information on the following Electrically Operated Equipment which I am thinking of buying.

....

....

My name is .....

Address .....

.....

I get electricity from .....

.....5-34

What's New

Reviewed by T. E. HIENTON

Names and addresses of manufacturers of the articles described in this column will gladly be furnished upon request. Address your requests to What's New Department, ELECTRICITY ON THE FARM, *24 West 40th Street, New York, N. Y.*

Electric Brooder Equipment

Electric brooders have been appearing on the narket in increasing numbers, particularly in the Middle West during recent years. This is due undoubtedly to the increasing demand for them from farmers, who have been prompted to secure those heated electrically to reduce labor and minimize danger of losing brooder house and flock from fire.

An announcement of an unusual development in the electric brooder field was made recently of electric equipment for home-made brooders. Heating equipment including thermostat and heater is offered for 250 and 500-chick sizes together with plans for the construction of the brooders. Heating capacity for the smaller size includes a pilot light and a 110-volt, 400-watt heat ring, for the larger the same light and two of the heat rings. Complete unassembled brooders are also available with necessary heating and control equipment.

Porcelain Indicating Cutout

A blown fuse is always an annoyance and particularly so on the farm. Power company service men may have to travel several miles to replace a fuse for the farm housewife as her husband may be busy in the field or away on business. A delay of an hour or two in the ironing frequently may upset the day's full program for the farmer's wife, all because of a blown fuse.

A new line of porcelain plug and cartridge cutouts which have neon lamp indicators built in permanently will be of interest to many farmers and their wives. When a fuse blows the neon lamp glows and an inspection of the fuse panel will show the fuse that needs replacement. This cutout is made the same size as present equipment with identical mounting holes so as to be interchangeable. This line also parallels the present line of plug and cartridge 30A, 60A, and 100A porcelain cutouts as well as 600-volt.

Washing Machine with Hydraulic Water Extractor

A new model of a popular washing machine uses a hydraulic water extractor. The clothes are transferred from the washing machine to a large rubber bag with a locking cover. Water pressure is then applied against the outside of the rubber bag, pushing the clothes against the cover and forcing the water out. The extracted water is pumped out through a swinging spout and either carried back to the machine or to the drain. By means of the hose which is furnished with the machine and used for filling it, hydrant water may be run over the clothes to thoroughly rinse them without removing them from the dryer bag. This eliminates much of the handling of the wet clothes. With this type of water extractor it is practically impossible for the operator to be hurt in any way.

Baked Custard

(*Continued from page* 14)

For cup custards, allow 4 eggs to 4 cups of milk, and bake for about 40 minutes; for large custard, 6 eggs; if less eggs are used, custard is liable to crack when turned on a serving dish.

Once you have the custard, you have a dessert you can twist around your finger to make the finish

of all sorts of meals. Marshmallows browned the last few minutes of cooking make a delicious meringue. A handful of crisp little chocolate straws change both looks and taste, a tablespoon of jelly topped with a dab of whipped cream makes a most inviting combination, while a little fresh fruit gives it still another air.

Load Signals for Motors

(*Continued from page* 12)

the supervision of experts if not for the little watch charm ammeter. The instrument and its installation are not expensive but it is possible the idea could be made less expensive by the use of lights or bells to indicate full loads on the motor. The best influences caused by the extra instrument are less interruptions during grinding and more confidence to attempt new work and new conditions with any grinder installation.

CLASSIFIED ADVERTISING

IDEAL HAY HOIST operates Hay Carrier with 2 to 5 H.P. motor or engine. Saves extra team and driver all through busy haying season. 10 DAYS' FREE TRIAL. Write for circular 202. UNIVERSAL HOIST & MFG. CO., CEDAR FALLS, IOWA.

TITLE CONTEST WINNERS

MARCH COVER

MAY RULES

Ten cash prizes will be awarded for the 10 best titles for the picture on the front cover of this magazine.

The first prize will be $20 cash and nine second prizes of $2 in cash will be awarded.

In case of a tie, each winning contestant will receive the full cash prize to which he or she is entitled.

Titles need not be longer than 10 words — the shorter the better — and they do not have to rhyme.

All members of the farm family to whom this magazine was sent may submit titles, but each contestant may submit only one title.

Question "A" must be answered correctly.

Send your title on the coupon below or make out a similar form on a plain sheet of paper or government post card.

Entries must be sent to the Title Editor, ELECTRICITY ON THE FARM, 6 North Michigan Avenue, Chicago, Illinois, before June 1st.

Winning names and titles will be announced in the July issue.

Awards for March

First Prize — $20

"A coming dairyman in sight
Starting young but starting right."

WALTER A. JONES,
R.F.D. 1, Powell, Ohio.

Nine $2.00 Cash Prizes

"With electric milker—this young man
Has the dairy problem well in hand!"

MRS. EUGENE MARSH, Rutland, Mass.

"A 'premature dairyman' you well may say,
But soon will be milking the easy way."

ROSS PETERS, R.F.D. 1, Michigantown, Ind.

"A good start for a modern farmer of the future."

SADIE M. GIRARD, R.F.D. 1, Ft. Wayne, Ind.

"A promising young farmer electrically inclined."

MRS. C. J. BETZ, Eden, N. Y.

"Dirt proof milk for our little Jean
By using an electric milking machine."

MRS. HARRY GIRTH, R.F.D. 2, Elba, N. Y.

"Electrical milking, efficient and quick.
Young Bob thinks it an easy trick."

LOUISA P. MALSBARY, Riverdale, Calif.

"Daddy's helper has decided to stay
To see the cows milked the electrical way.

MRS. NELSON McCALL, Charlestown, Md.

"This future dairyman as you see
Is planning to milk electrically."

MRS. CHAS. T. BRADLEY, R.F.D. 1, Lee, Mass.

"Beside the cow stands the farmer's son
To see his work electrically done."

MISS VIVIAN DOWNING, R.F.D. 1, Mt. Carroll, Ill.

My title for the May Front Cover picture of ELECTRICITY ON THE FARM is .....

.....

.....

.....

(a) How much did it cost to have your farmhouse and other buildings wired for electric service? $.....

My name is ..... R.F.D. .....

Post Office ..... County ..... State 5-34

Electricity on the Farm
24 West 40th Street
New York, N. Y.

Return Postage Guaranteed

Rural Service Department
May 1st, 1934

Dear Customer:

Hot weather will soon be here. Your kitchen will be hot and uncomfortable enough without the unnecessary extra heat thrown off from your cook stove.

Perhaps you have a "summer kitchen" which will give you some relief from the heat and odors from your stove. But even the greater comfort of the "summer kitchen" cannot entirely make up for the extra steps and the other inconveniences of doing your cooking in an out-of-the-way place where you never have at hand the things you need.

Why not do your cooking this summer by electricity? If you do, it is almost certain you will keep it up the year around.

With electricity, you can cook in comfort without standing over a fiery range that shoots the temperature well above the 100 mark. Listen to this:

"It makes no difference how hot the day is, I can bake in comfort with my electric range. I would never want to go back to the old-fashioned cook stove and guess work in baking."

That statement was taken from a letter written by Mrs. Henry Esserman, R. R. 2, Chesterton, Ind., who has solved her cooking problems by using electricity. Besides, the Essermans use electricity in many other ways on their dairy farm. They've found that the more you use, the less it costs.

Very truly yours,

Indiana Service Corporation

355—e

Sec. 34.66 P. L. & R.
U. S. POSTAGE
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New York, N. Y.
Permit No. 552